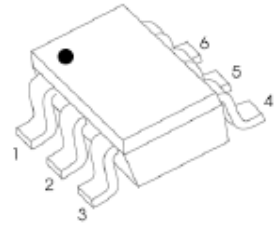


MMDT2222A

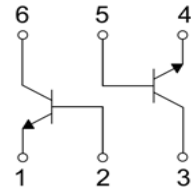
Dual NPN Transistor

Features

- Ideal for medium power amplification and switching
- Ultra-small surface mount package
- Complementary PNP type available MMDT2907A



SOT-363



Schematic Diagram

Absolute Maximum Ratings

($T_A=25^\circ\text{C}$ unless otherwise noted)

| Parameter | Symbol | Rating | Unit |
|------------------------------|-----------|-------------|------------------|
| Collect-Base Voltage | V_{CBO} | 75 | V |
| Collector-Emitter Voltage | V_{CEO} | 40 | V |
| Emitter-Base Voltage | V_{EBO} | 6 | V |
| Collector Current-Continuous | I_C | 600 | mA |
| Collector Power Dissipation | P_C | 200 | mW |
| Junction Temperature | T_J | -55 to +150 | $^\circ\text{C}$ |
| Storage Temperature | T_{STG} | -55 to +150 | $^\circ\text{C}$ |

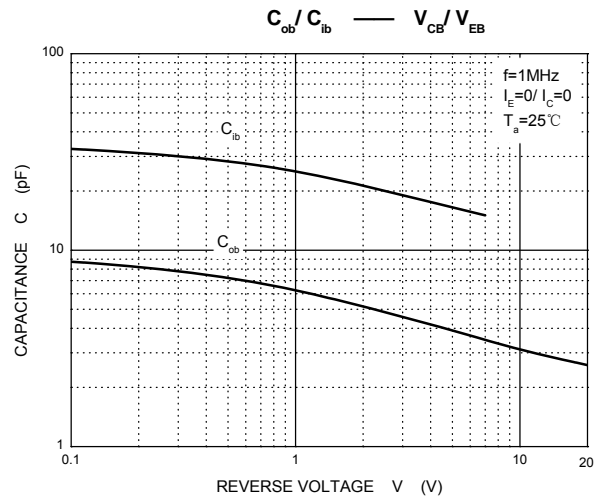
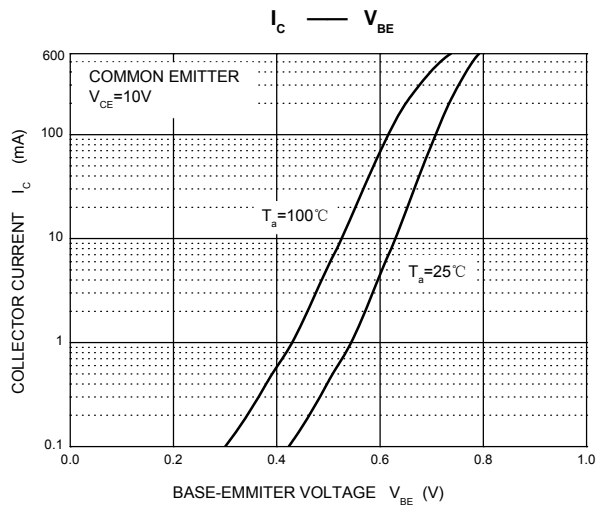
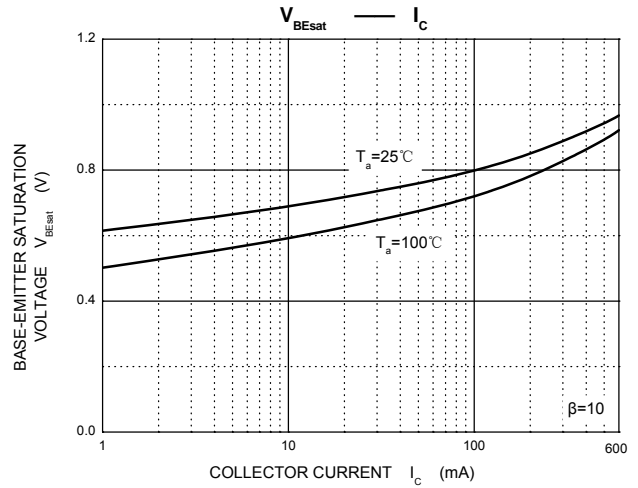
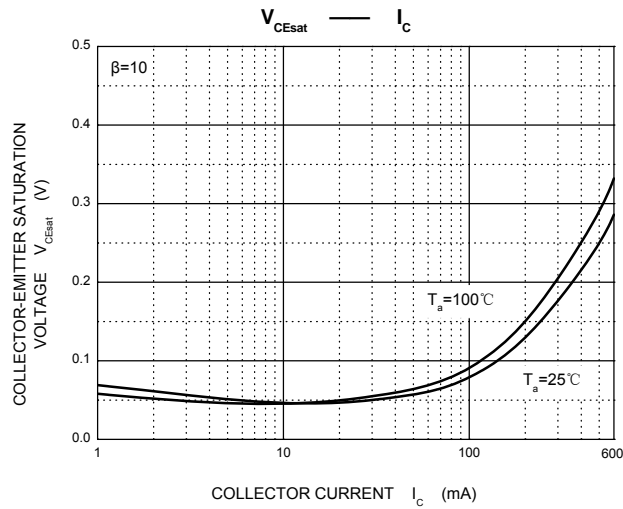
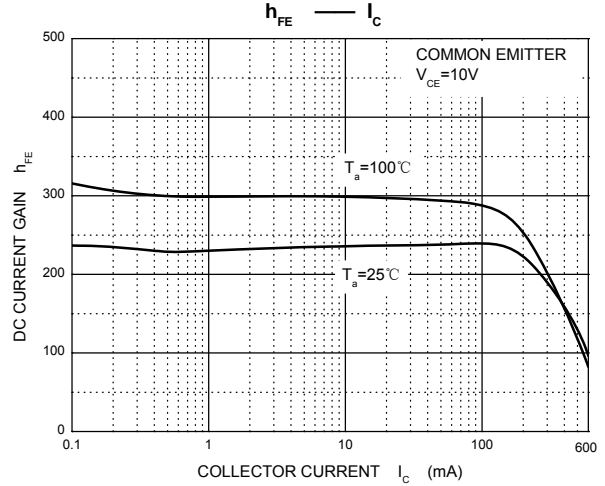
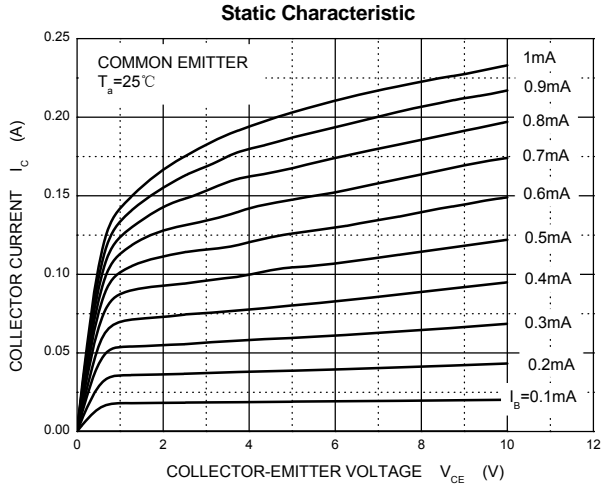
Electrical Characteristics ($T_A=25^\circ\text{C}$ unless otherwise noted)

| Parameter | Symbol | Test Condition | Min | Max | Unit |
|--------------------------------------|----------------|---|-----|-----|------|
| Collector-base Breakdown Voltage | $V_{(BR)CBO}$ | $I_C=10\mu\text{A}, I_E=0$ | 75 | -- | V |
| Collector-emitter Breakdown Voltage | $V_{(BR)CEO}$ | $I_C=10\text{mA}, I_B=0$ | 40 | -- | V |
| Emitter-base Breakdown Voltage | $V_{(BR)EBO}$ | $I_E=10\mu\text{A}, I_C=0$ | 6 | -- | V |
| Collector Cut-off Current | I_{CBO} | $V_{CB}=60\text{V}, I_E=0$ | -- | 10 | nA |
| Collector Cut-off Current | I_{CEX} | $V_{CB}=60\text{V}, I_{E(B(off))}=3\text{V}$ | -- | 10 | nA |
| Emitter Cut-off Current | I_{EBO} | $V_{EB}=3\text{V}, I_C=0$ | -- | 10 | nA |
| DC Current Gain | $h_{FE(1)}$ | $V_{CE}=10\text{V}, I_C=0.1\text{mA}$ | 35 | -- | -- |
| | $h_{FE(2)}$ | $V_{CE}=10\text{V}, I_C=1\text{mA}$ | 50 | -- | -- |
| | $h_{FE(3)}$ | $V_{CE}=10\text{V}, I_C=10\text{mA}$ | 75 | -- | -- |
| | $h_{FE(4)}$ | $V_{CE}=10\text{V}, I_C=150\text{mA}$ | 100 | 300 | -- |
| | $h_{FE(5)}$ | $V_{CE}=10\text{V}, I_C=500\text{mA}$ | 40 | -- | -- |
| | $h_{FE(6)}$ | $V_{CE}=1\text{V}, I_C=150\text{mA}$ | 35 | -- | -- |
| Collector-emitter Saturation Voltage | $V_{CE(sat)1}$ | $I_C=150\text{mA}, I_B=15\text{mA}$ | -- | 0.3 | V |
| | $V_{CE(sat)2}$ | $I_C=500\text{mA}, I_B=50\text{mA}$ | -- | 1 | V |
| Base-emitter Saturation Voltage | $V_{BE(sat)1}$ | $I_C=150\text{mA}, I_B=15\text{mA}$ | 0.6 | 1.2 | V |
| | $V_{BE(sat)2}$ | $I_C=500\text{mA}, I_B=50\text{mA}$ | -- | 2 | V |
| Transition Frequency | f_T | $V_{CE}=20\text{V}, I_C=20\text{mA}, f=100\text{MHz}$ | 300 | -- | MHz |
| Output Capacity | C_{ob} | $V_{CB}=10\text{V}, I_E=0, f=1\text{MHz}$ | -- | 8 | pF |
| Input Capacity | C_{ib} | $V_{EB}=0.5\text{V}, I_C=0, f=1\text{MHz}$ | -- | 25 | pF |
| Noise Figure | NF | $V_{CE}=10\text{V}, I_C=100\mu\text{A}, f=1\text{KHz}, R_S=1\text{k}\Omega$ | -- | 4 | dB |

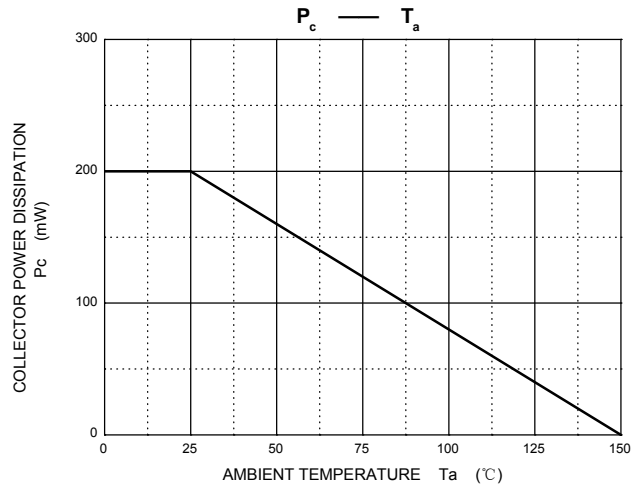
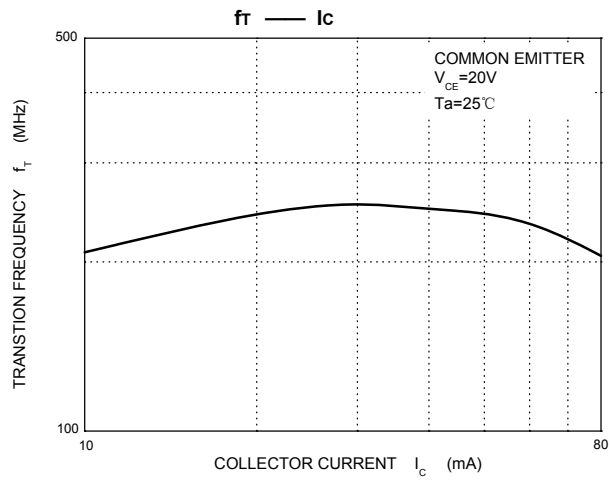
Switching Characteristics

| Parameter | Symbol | Test Condition | Min | Max | Unit |
|--------------|--------|--|-----|-----|------|
| Delay Time | t_d | $V_{CC}=30\text{V}, I_C=150\text{mA}, V_{BE(off)}=0.5\text{V}, I_{B1}=15\text{mA}$ | -- | 10 | ns |
| Rise Time | t_r | | -- | 25 | ns |
| Storage Time | t_s | $V_{CC}=30\text{V}, I_C=150\text{mA}, I_{B1}=-I_{B2}=15\text{mA}$ | -- | 225 | ns |
| Fall Time | t_f | | -- | 60 | ns |

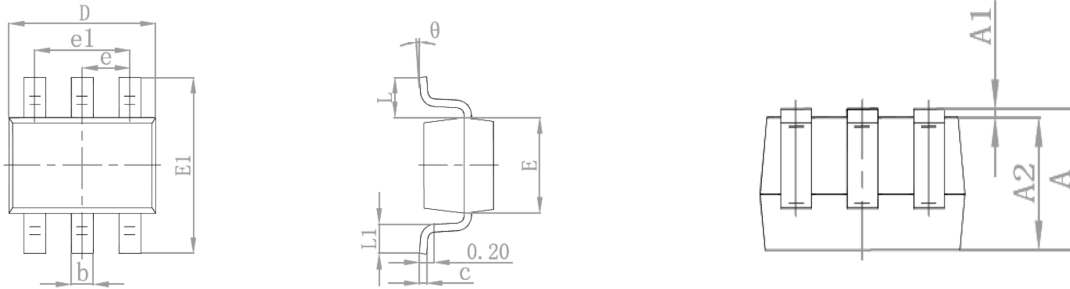
Typical Characteristics Curves ($T_A = 25^\circ\text{C}$ unless otherwise noted)



Typical Characteristics Curves ($T_A = 25^\circ\text{C}$ unless otherwise noted)

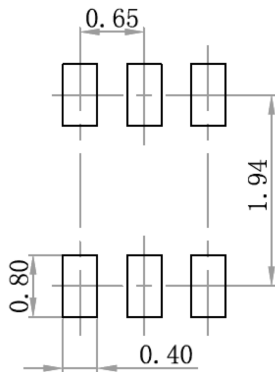


Package Outline Dimensions SOT-363



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|-------|----------------------|-------|
| | Min | Max | Min | Max |
| A | 0.900 | 1.100 | 0.035 | 0.043 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 0.900 | 1.000 | 0.035 | 0.039 |
| b | 0.150 | 0.350 | 0.006 | 0.014 |
| c | 0.100 | 0.150 | 0.004 | 0.006 |
| D | 2.000 | 2.200 | 0.079 | 0.087 |
| E | 1.150 | 1.350 | 0.045 | 0.053 |
| E1 | 2.150 | 2.400 | 0.085 | 0.094 |
| e | 0.650 TYP | | 0.026 TYP | |
| e1 | 1.200 | 1.400 | 0.047 | 0.055 |
| L | 0.525 REF | | 0.021 REF | |
| L1 | 0.260 | 0.460 | 0.010 | 0.018 |
| θ | 0° | 8° | 0° | 8° |

Recommended Pad Layout



Note:

1. Controlling dimension: in millimeters
2. General tolerance: 0.05mm
3. The pad layout is for reference purpose only